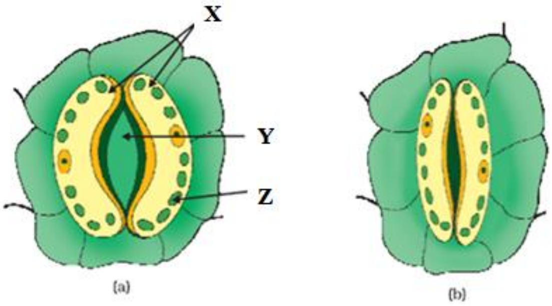
WORKSHEET - 2
Nutrition in plants

ANALYTICAL MCQS

(1) Identify X, Y and Z in the given diagram.



	X	Y	Z
(A)	Guard cells	Stoma	Nucleus
(B)	Stoma	Guard cells	Chloroplast
(C)	Guard cells	Stoma	Chloroplast
(D)	Chloroplast	Guard cells	Nucleus

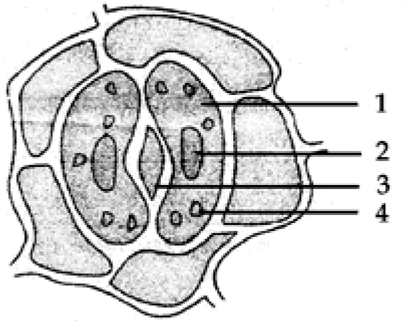
Directions: (Q.2 & Q.3) State whether the given statements are TRUE or FALSE:

(2) Generally stomata are open during the night time and closed during the day time.
(A) True (B) False

(3) Exchange of gases occurs through the surface of leaves but not through stems and roots
(A) True (B) False

(4) Aquatic plants absorb dissolved CO_2 through
(A) Stomata (B) Osmosis (C) Lenticels (D) Diffusion

(5) A student draws the following sketch of stomatal apparatus and numbers the parts as 1, 2, 3 and 4. Chloroplast is denoted by?



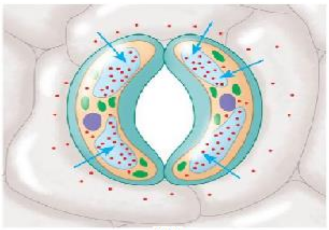
(A) 1 (B) 2 (C) 3 (D) 4

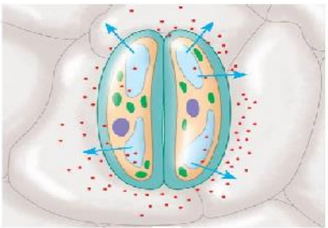
(6) What is the fate of water molecule during photosynthesis inside chloroplast?
(A) Water is used as a solvent to dissolve pigments such as chlorophyll
(B) Water is used in the production of carbohydrate and proteins
(C) Water is used as a cooling agent during photosynthetic reaction
(D) Water splits into hydrogen and oxygen with the help of sunlight

(7) Which of the following regarding importance of photosynthesis is true except
(A) It purifies the atmospheric air by consuming CO_2 and evolving O_2
(B) It converts light energy into chemical energy

(C) It is the only source of ATP production by green plants for providing energy
(D) It is an anabolic process in nature for providing food supply

(8) The following figure shows process taking place during photosynthesis. Which of the following is the correct figure showing the night time of desert plants?


(A)


(B)

(A) A (B) B (C) Both (a) and (b) (D) None of the above

CASE STUDY MCQS

I) **Directions:** Q. 1 to Q. 4 are based on matching the columns. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE is correct.

	Column-I		**Column-II**
(A)	Photolysis	(p)	CO_2 fixation into carbohydrate by use of ATP and $NADPH_2$
(B)	Photophosphorylation	(q)	Conversion of light energy into chemical energy by formation of ATP and $NADPH_2$
(C)	Light reaction	(r)	Production of ATP from ADP and inorganic phosphate in presence of light
(D)	Dark reaction	(s)	Splitting of water molecule in presence of light into oxygen and hydrogen

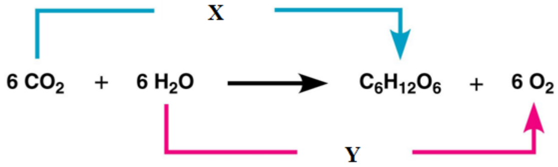
(1) Option A matches with
(A) p (B) q (C) r (D) s

(2) Option B matches with
(A) p (B) q (C) r (D) s

(3) Option C matches with
(A) p (B) q (C) r (D) s

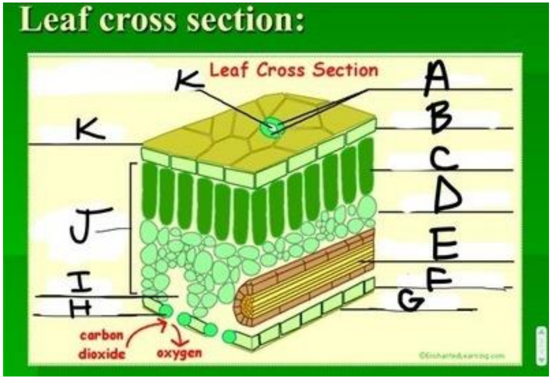
(4) Option D matches with
(A) p (B) q (C) r (D) s

II) Study the given equation of photosynthesis and answer the following questions:
i. Identify the process 'Y'.
ii. Where does it occurs?
iii. What are its products?



	i	ii	iii
(A)	Light reaction	Grana	ATP and $NADPH_2$
(B)	Light reaction	Stroma	ATP and O_2
(C)	Dark reaction	Thylakoid	NADPH2 and O_2
(D)	Dark reaction	Stroma	Sugar and O_2

III) Observe the cross section of leaf and answer the questions:



(1) Which is the first layer of the leaf and its function?
(A) The palisade mesophyll; do not let the leaf cells die and exchange of gases
(B) The upper epidermis, exchange of gases and protect the leaf
(C) The waxy cuticle; protects the cells inside the leaf and carry water
(D) The waxy cuticle; reduces the of water loss from the leaf surface and does not let the cells in the leaf die.

(2) What is beside the stomata?
(A) Guard cells (B) Epidermal cells
(C) Spongy mesophyll cells (D) Substomatal cells

(3) In which part most of the photosynthesis is done?
(A) Waxy cuticle (B) Palisade Mesophyll
(C) Spongy Mesophyll (D) B and C

(4) What is 'D' pointing to?
(A) Spongy mesophyll (B) Stomata
(C) Upper epidermis (D) Palisade mesophyll

(5) The photosynthetic cells in the interior of a leaf are what kind of cells?
(A) parenchyma (B) phloem
(C) collenchyma (D) sclerenchyma

IV) Read the passage and answer the questions that follow:

Factors Affecting Photosynthesis

Various factors influence/affect the photosynthesis process. Some of the external factors are:

Light Intensity: More the light, the more will be the rate of photosynthesis. Similarly, low light will lead to a low rate of photosynthesis. As light intensity increases, the rate of photosynthesis initially increases, and thereafter, levels off to a plateau.

The Concentration of CO2: A higher CO2 concentration rate in a plant also accelerates the photosynthesis process. The required amount of CO2 is 300-400 PPM. increasing levels of carbon dioxide around the plant stimulates photosynthesis until it reaches a plateau.

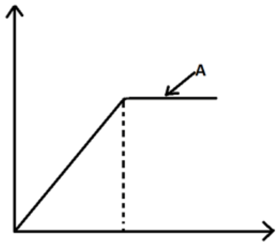
Temperature: If the temperature is between the range of 25 to 35 degrees Celsius, the photosynthesis takes place effectively. As the temperature increases, the stomata begin to close, to limit water loss. This will have the effect of stopping the carbon dioxide from entering the leaf. This will also decrease the rate of photosynthesis.

Water: An essential amount of water is required for stomatal opening, and it’s a key factor in the process of photosynthesis. Plants such as the cactus have adaptations like thick cuticle, sunken stomata to prevent water loss in dry, desert climates.

Pollution: The increasing rate of polluting particles in the atmosphere block the pores of somatic cells, and the intake of carbon dioxide becomes difficult.

(1) Which of these is not an external factor affecting photosynthesis?
(A) Sunlight (B) Temperature (C) Leaf orientation (D) CO_2 concentration

(2) A portion of the graph ‘Rate of photosynthesis vs. Light intensity’ is labelled ‘A’. What causes ‘A’?



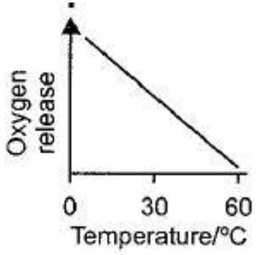
(A) Increase in light intensity (B) Decrease in light intensity
(C) Opening of stomata (D) Closing of stomata

(3) Assertion: The increasing rate of polluting particles in the atmosphere block the pores of somatic cells, and the intake of carbon dioxide becomes difficult.
Reason: Rate of photosynthesis decreases.
(A) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(B) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(C) If Assertion is true but Reason is false.
(D) If both Assertion and Reason are false.

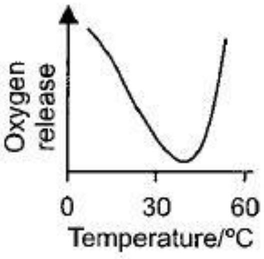
(4) Photosynthesis begins to decline when leaves wilt. Find the best possible reason for this to occur.
(A) flaccid cells are incapable of photosynthesis.
(B) CO_2 accumulates in the leaves and inhibits photosynthesis.
(C) there is insufficient water for photolysis during light reactions.
(D) stomata close, preventing CO2 entry into the leaf.

(5) Which graph shows the effect of temperature on the rate of photosynthesis of the aquatic plants such as Elodea?

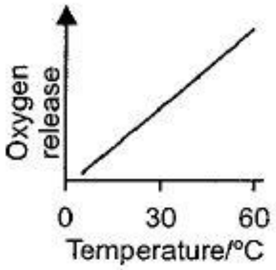
(A)



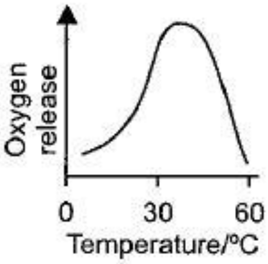
(B)



(C)



(D)



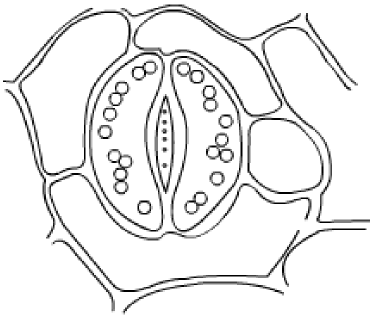
V) The opening and closing of stomata is controlled by the guard cells. When water flows into the guard cells, they swell up and the curved surface causes the stomata to open. When the guard cells loses water, they shrink and become flaccid and straight thus closing the stomata.

Keeping the structure and functions of stomata in mind, solve the following questions:

(1) The main function of guard cells is to help with ____________

(A) Transpiration (B) Guttation (C) Transcription (D) None of the above

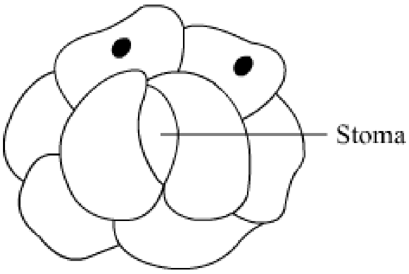
(2) In the sketch of the stomatal apparatus given alongside, which one of the following is missing?



(A) Cell membranes of the cells (B) Cell walls of the cells

(C) Nuclei in the guard cells (D) Chloroplasts in the guard cells

(3) A student had drawn the diagram of stomata in a hurry, as shown alongside. He could not be given full marks as he.



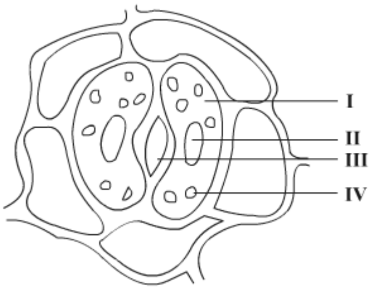
(A) forgot to draw nuclei in guard cells and also to label the diagram.

(B) did not draw nuclei in guard cells and other cells.

(C) should have drawn nuclei and chloroplasts in guard cells and nuclei in all epidermal cells.

(D) did not label the stoma in the correct position.

(4) In the sketch of stomatal apparatus given alongside, the parts I, II, III and IV were labelled differently by four students. The correct labelling is shown in.



(A) (I) guard cells, (II) stoma, (III) starch granule, (IV) nucleus

(B) (I) cytoplasm, (II) nucleus, (III) stoma, (IV) chloroplast

(C) (I) guard cells, (II) starch, (III) nucleus, (IV) stoma

(D) (I) cytoplasm, (II) chloroplast, (III) stoma, (IV) nucleus

(5) Find the incorrect statement:
(A) Stomata swell due to endosmosis of water.
(B) Stomata become flaccid due to exosmosis of water.
(C) Stomata remain closed at night in desert plants.
(D) Stomata remain open during the day only.

ASSERTION-REASON MCQS

Directions: In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.
(e) If assertion is false but reason is true.

(1) Assertion : Stomata remain open during day.
Reason : Stomata help in exchange of gases during photosynthesis.

(2) Assertion (A): The opening and closing of the pore is a function of the guard cells.
Reason (R) : Stomatal pores are the site for exchange of gases by diffusion.

(3) Assertion : Cuscuta is a parasite
Reason : Leech is also a parasite as they do not get nutrition from host.

(4) Assertion; Dark reaction in photosynthesis occurs in the grana
Reason: It does not require light energy

(5) Assertion: Light and dark reaction take place simultaneously.
Reason: Products of light reaction are used in dark reaction.

(6) Assertion: In photosynthesis, Carbon is reduced to form glucose.
Reason: Hydrogen ions are donated by NADPH2.

(7) Assertion: Just after photosynthesis, carbohydrate is converted into starch.
Reason: Starch is a polysaccharide that acts as reserve food material in plants.

(8) Assertion: The opening and closing of the stomatal pores depends upon water in guard cells.
Reason: When guard cells have water, stoma open and when they lose water, the stoma closes.

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